Citation:

Woodruff SJ, Hanning RM, Lambraki I, Storey KE, McCargar L. Healthy Eating Index-C is compromised among adolescents with body weight concerns, weight loss dieting, and meal skipping. *Body Image*. 2008 Dec;5(4):404-8.

PubMed ID: 18640883

Study Design:

Cross-sectional Study

Class:

D - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

The objective of this project was to describe body weight concerns, dieting status, and meal skipping of adolescents by sex, grade, and body weight, using the web-based Food Behavior Questionnaire (FBQ). They were interested in finding if overall diet quality was influenced by weight concerns, dieting and meal skipping.

Inclusion Criteria:

Participants were recruited from public and private Ontario and Alberta schools. Students were in grades 9 or 10 (13-17 years old). Students and parents had given consent.

Exclusion Criteria:

Students who did not provide height and/or weight (N=482), sex (N=24), or responses to questions about weight concerns and/or dieting (N=284) were excluded.

Description of Study Protocol:

Recruitment: Recruitment followed a two-stage (school board, school) stratified, randomized sampling procedure. The school, student, and parent consented for participation.

Design: Cross-sectional study

Blinding used: not applicable

Intervention: not applicable

Statistical Analysis:

- Statistical procedures were completed using Minitab version 14.
- Chi-square analyses were used to determine bivariate associations between group membership

(Groups 1-4) and the descriptor variables (sex, grade, body weight), meal skipping and diet quality.
- An ordinal logistic regression analysis was used to determine associations between the diet quality ratings and group membership.

Data Collection Summary:

Timing of Measurements: Students independently completed a validated web-based FBQ during school hours at the school computer lab which took about 30-40 minutes to complete.

Dependent Variables:

- Diet quality rating measured with FBQ and nutrient analysis software ESHA and scored from 0-100.
- Diet quality was assessed using the US-based Healthy Eating Index (HEI), Canadian version (HEI-C), using nutrient analysis software (ESHA), and give a score ranging from 0-100 (100 indicating perfect).
- BMI was calculated from height and weight.

Independent Variables:

- Weight concern and dieting measures taken from students' questionnaire responses.
- Participants were classified as *weight concerned* and/or *dieting* depending on answers to the questions and placed in one of four groups: Group 1=not weight concerned and not dieting; Group 2=not weight concerned yet dieting; Group 3=weight concerned yet not dieting; Group 4=both weight concerned and dieting.

Control Variables:

Description of Actual Data Sample:

Initial N: Of 42 school boards approached, 28 agreed to participate (67%). School level response rates were 45% for both public (N=33) and catholic (N=14) schools and 24% for private (N=10) schools. A total of 2,616 grade 9 and 10 students (aged 13-17) completed the survey.

Attrition: Participants who did not provide height and/or weight (N=482), sex (N=24), or responses to questions about weight concerns and/or dieting (N=284) were excluded for a final sample of 880 grade 9 and 946 grade 10 students. 810 males and 1016 females.

Age: 13-17 years

Ethnicity: not reported

Other relevant demographics:

Anthropometrics: 78% classified as normal weight, 19% as overweight, and 3% as obese, which is similar to the prevalence of the Canadian adolescent population.

Location: Ontario and Alberta provinces of Canada.

Summary of Results:

Key Findings:

- 28% (N=518) were concerned about a high body weight
- 20% (N=364) reported eating less to lose weight.
- More females than males (P<.001) and more overweight/obese than normal weight participants (P<.001) were in groups 3 and 4 (concerned about high body weight).
- Among normal weight individuals, 26% were dieting or weight concerned, and most of these were female (88%)
- Among overweight/obese individuals 41% were neither dieting nor weight concerned, in which the majority were males (83%).
- 27% skipped breakfast, 14% lunch, or 7% dinner meals.
- The mean HEI-C score for all participants was 69 (±13.2), falling into the needs improvement category. 71% were classified as needs improvement, 8% poor diet, and 21% good diet.
- Higher mean diet quality scores were seen in group 1 compared to group 4 (P<.001).
- Mean diet quality scores were higher for those consuming breakfast, lunch and dinner, yet were still all categorized as needs improvement.
- By ordinal logistic regression analysis, participants who were both dieting and weight concerned (Group 4) were more likely to have a worse diet quality (OR=0.59; 95% CI 0.42, 0.81)

	Not concerned about high body weight		Concerned about high body weight	
	Not dieting (1224)	Dieting (84)	Not dieting(238)	Dieting (280)
	Group 1	Group 2	Group 3	Group 4
Normal Wt (1428)	521	18	14	12
Males	540	40	135	148
Females				
Overwt/Obese(398)	135	17	43	50
Males	28	9	46	70
Females				

Author Conclusion:

Many Ontario and Alberta grade 9 and 10 students were weight concerned, dieting, and/or meal skipping, especially females and overweight/obese adolescents. Over one quarter of those dieting or concerned about their high body weight were actually of healthy weights and 41% of those not concerned and not dieting were overweight/obese. Lower diet quality among those weight concerned and dieting and those skipping breakfast, suggests that adolescents are not addressing weight concerns or approaching dieting appropriately.

Reviewer Comments:

Authors note the following limitations:

- *Use of a one-item response to assess the variables of weight concerns and dieting may not have adequately captured true dieting or weight concern behaviours*
- *Low response rate of schools raises uncertainty about the representativeness of the sample*
- *Self-reported survey data have the potential for recall error, inaccurate estimation of portion sizes,*

systematic bias in dietary reporting and providing socially desirable answers

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Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A
Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	No
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes

3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	Yes
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	Yes
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	N/A
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A

6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes

10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes